

Yakeen NEET 2.0 2026

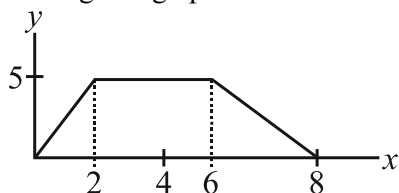
Basic Maths and Calculus (Mathematical Tools)

Assignment-04
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1. Find value of given mathematical expression.

- (i) $e^{-\infty}$ (ii) $\cos 3^\circ$
(iii) $\frac{1}{0.001}$ (iv) $\frac{6}{0.3}$
(v) $\sqrt{0.49}$ (vi) e^0
(vii) $\sqrt{1-0.19}$

2. Find area of given graph



3. Which of the following formula is wrong.

- (1) $\sin 2\theta = 2 \sin \theta \cdot \cos \theta$
(2) $\cos (2\theta) = \cos^2 \theta - \sin^2 \theta$
(3) $\sin \theta = 2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}$
(4) $\cos \theta = \sin^2 \frac{\theta}{2} - \cos^2 \frac{\theta}{2}$

4. Find distance between centre to corner of equilateral triangle of side a .

5. Find value of different trigonometric ratio

- (i) $\sin (-45^\circ)$ (ii) $\cos (405^\circ)$
(iii) $\sin (390^\circ)$ (iv) $\sin (300^\circ)$
(v) $\tan (-120^\circ)$

6. If $\sin (\alpha) = 0.6$ and $\cos (\beta) = 0.8$, where α and β are acute angles, what is the value of $\sin (\alpha + \beta)$?

- (1) 0.28 (2) 0.48
(3) 0.96 (4) 1.88

7. In a right triangle, the length of the hypotenuse is 10 cm and one of the acute angles is 30° . What is the length of the side opposite to the 30° angle?

- (1) 5 cm (2) $5\sqrt{3}$ cm
(3) 10 cm (4) $10\sqrt{3}$ cm

8. If a triangle ABC , the side AB is 8 cm, side BC is 8 cm, and side AC is $8\sqrt{2}$ cm. What is the measure of angle C ?

- (1) 30° (2) 45°
(3) 60° (4) 90°

9. If $\cos (\alpha) = \frac{1}{\sqrt{2}}$ and $\cos (\beta) = \frac{\sqrt{3}}{2}$, where $0^\circ < \alpha$, $\beta < 90^\circ$, find the value of $\sin (\alpha + \beta)$.

- (1) 0.58 (2) 0.72
(3) 1.85 (4) 0.96

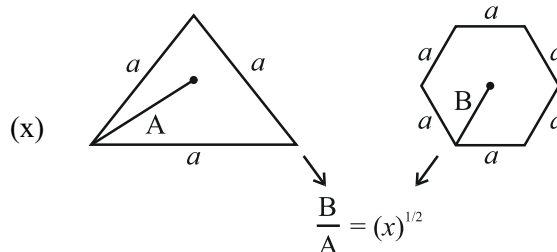
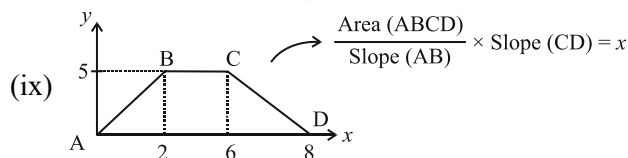
10. Find value of x for following expression:

- (i) $\frac{1}{0.001} = 10^{-x}$
(ii) $3^x = 1$
(iii) $\sqrt{0.49} = 700 \times 10^{-x}$
(iv) $\sqrt{1-x} = 3^{3/2}$
(v) $\frac{0.125}{(1/x)} = e^0$

(vi) $\frac{6}{0.3} = 5 \cdot (2^x)$

(vii) $\frac{153 \times 162 \times 13 \times 3}{18 \times 17 \times 117} = (9)^{\frac{x}{2}}$

(viii) $\frac{(4^x + 4^{-1}) \times 2^2}{10} = \sqrt{\frac{125}{5} \times 10^{-2}}$



11. Correct matrix match

(A) $I = \sin(\omega t - \pi/4)$ $V = \cos(\omega t - 3\pi/4)$	(i) Current lay voltage by $2\pi/3$
(B) $I = \sin(\omega t + \pi/6)$ $V = \cos(\omega t + \pi/3)$	(ii) Voltage leads by current by $\pi/6$
(C) $I = \sin(\omega t - \pi/6)$ $V = \cos(\omega t + \pi/6)$	(iii) Current leads by voltage $\pi/3$
(D) $I = \sin(\omega t + 2\pi/3)$ $V = \cos(\omega t - \pi/6)$	(iv) Voltage is in phase of current

12. Correct matrix match

(A) $\sin(-120)$	(1) $\frac{4}{5}$
(B) $\cos(150)$	(2) $-\frac{\sqrt{3}}{2}$
(C) $\tan(135)$	(3) $-\frac{\sqrt{3}}{2}$
(D) $\tan(143)$	(4) -1
(E) $\sin(127)$	(5) $-\frac{3}{4}$

13. If 64 identical liquid sphere combine to bigger sphere then find radius of bigger sphere.

14. A wire of length L bend into circle and square then find ratio of radius of circle and side of square.

15. Which of the following is True/False.

(i) $2^3 \times 2^2 = 2^6$

(ii) $2^{10} \times 3^{10} = 5^{10}$

(iii) $2^{10} \times 3^{10} = 6^{10}$

(iv) $\sqrt{xy} = \sqrt{x} \times \sqrt{y}$

(v) $\sqrt{x+y} = \sqrt{x} + \sqrt{y}$

(vi) $4^2 + 3^2 = 7^2$ (vii) $\frac{1}{3} < \frac{1}{\sqrt{3}}$

(viii) $\frac{4}{3} < \frac{3}{4}$

(ix) $\frac{2}{3} < \frac{7}{5}$

(x) $2.0 = 0.02 \times 10^{-2}$

16. Find x in given expression:

(i) $\frac{1}{2} + \frac{1}{5} + \frac{1}{7} = x$

(ii) $27 = 3^{\frac{1}{x}}$

(iii) $32 = (\sqrt{2})^x$

(iv) $\frac{\sqrt{4}}{4^2} = 4^x$

(v) $\frac{0.001 \times 10^{-4}}{10 \times 10^{-3}} = 10^x$

(vi) $y^2 \cdot y^{3/2} = y^x$

(vii) $\frac{4200 \times 0.001}{10^{-2}} = 42 \times 10^x$

(viii) $\frac{0.326 \times 10^{-4}}{10^{+3}} = 32.6 \times 10^x$

(ix) $0.52 \times 10^{-8} = 520 \times 10^x$

(x) $\frac{0.75 \times 30}{45 \times 0.25} = 4^{\frac{1}{x}}$

17. In a decay process the number of nuclei $N = N_0 e^{-\lambda t}$ where N_0 and λ is constant, find rate of decay

(1) λN_0 (2) $-\lambda N$

(3) $N_0 \lambda e^{-\lambda t}$ (4) $\frac{\lambda}{N_0}$

18. Focal length ' f ' of a lens varies with temperature as

$f = f_0(1 + \alpha T)$ find $\frac{df}{dT}$

(1) αf_0 (2) f_0

(3) α (4) f_0/α

19. Electric potential in a conservative field varies with space as $V = ax^2 + by + cz$, find electric field at point

(1, 1) if $E = -\frac{dV}{dr}$

(1) $2a\hat{i} + b\hat{j}$ (2) $2\hat{i} - b\hat{j}$

(3) $2a\hat{i} - b\hat{j}$ (4) $-(2a\hat{i} + b\hat{j})$

20. $y = a \cos t$, $x = a(t - \sin t)$ find $\frac{dy}{dx}$ at $t = \frac{\pi}{2}$

- (1) -1 (2) 1
(3) 0 (4) $\frac{1}{2}$

21. $x = a \cos^3 t$, $y = a \sin^3 t$ find $\frac{dy}{dx}$

- (1) $\cot t$ (2) $\tan t$
(3) $-\frac{1}{\tan t}$ (4) $-\frac{1}{\cot t}$

22. $x^3 + y^3 = 3xy$, find $\frac{dy}{dx}$

- (1) $\frac{y-x^2}{y^2-x}$ (2) $\frac{y^2-x}{y-x^2}$
(3) $\frac{y^2-x^2}{y^2+x^2}$ (4) $\frac{y+x^2}{y^2+x}$

23. $x = t + 1$ and $y = t^2 + t^3$ find $\frac{d^2y}{dx^2}$

- (1) $2 + 6t$ (2) $2 - 6t$
(3) $2 + 6t^2$ (4) $2 - 6t^2$

24. A charged particle moves such that $x(t) = Ae^{kt}$ what is the electric current if charge is proportional to x .

- (1) kAe^{kt} (2) Ae^{kt}
(3) Ake^{-kt} (4) zero

25. Kinetic energy of a particle is given as $k = at^3$, find power delivered to particle if power is rate of change in kinetic energy w.r.t. time:

- (1) $3at^2$ (2) $2at$
(3) at^2 (4) None

26. A particle moves such that its velocity and position are related by $v = kx$, if acceleration is defined as $\frac{v dv}{dx}$ find its acceleration at $x = 2m$.

- (1) $2k$ (2) $2k^2$
(3) $4k$ (4) zero

27. Volume of a gas changes with temperature as $V = \frac{A}{T}$, find rate of change in volume w.r.t. temperature. [$A = \text{constant}$]

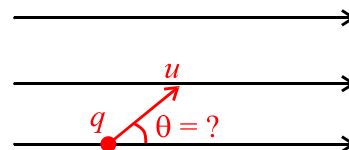
- (1) $\frac{A}{T^2}$ (2) $-\frac{A}{T^2}$
(3) $\frac{A}{T}$ (4) zero

28. Horizontal range in projectile motion can be given as $\frac{u^2 \sin 2\theta}{g}$ as shown below, find angle of projection for which range will be maximum.



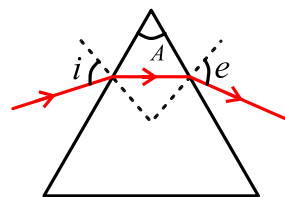
- (1) 45° (2) 60°
(3) 37° (4) 53°

29. A charged particle is released in a uniform horizontal electric field. At what initial angle it should be projected so that maximum height attained, if maximum height attained is directly proportional to vertical velocity and force inside electric field is $F = qE$



- (1) $\theta = 0^\circ$ (2) $\theta = 90^\circ$
(3) $\theta = 180^\circ$ (4) $\theta = 45^\circ$

30. In prism experiment deviation can be given as $\delta = i + e - A$ as shown below. Then find the condition if deviation is minimum.



- (1) $i = 0^\circ$ (2) $i = 90^\circ$
(3) $e = 0^\circ$ (4) $i = e$

31. The potential energy stored in a spring varies as $U = \frac{1}{2}kx^2 + \alpha x^3$, for what value of x , magnitude of force is maximum if force and potential energy related as $F = -\frac{\partial U}{\partial x}$

(1) $x = \frac{k}{6\alpha}$ (2) $x = \frac{6k}{\alpha}$
 (3) $x = \frac{-6k}{\alpha}$ (4) $x = \frac{-k}{6\alpha}$

32. Work done by gas is given by $dW = P.dV$, if $V = ax^2 - bx$, find value of x at which work is maximum.

(1) $\frac{a}{2b}$ (2) $\frac{b}{2a}$
 (3) $\frac{a}{b}$ (4) $-\frac{a}{b}$

33. Force on charge ' q ' on axial point at a distance ' x ' from centre of uniformly charged ring is $\frac{kqx}{(R^2 + x^2)^{3/2}}$ where, k is constant, R is radius of ring. For what value of x , force will be maximum.

(1) $x = \frac{R}{2\sqrt{2}}$ (2) $x = \frac{R}{\sqrt{2}}$
 (3) $\sqrt{2}R$ (4) R

ANSWER KEY

- | | | |
|--|--|-----------------|
| 1. (i) 0 | (ii) 1 | (ii) False |
| (iii) 10^3 | (iv) 20 | (iii) True |
| (v) 0.7 | (vi) 1 | (iv) True |
| (vii) 0.9 | | (v) False |
| 2. (30) | | (vi) False |
| 3. (4) | | (vii) True |
| 4. $\frac{a}{\sqrt{3}}$ | | (viii) False |
| | | (ix) True |
| | | (x) False |
| 5. (i) $-\frac{1}{\sqrt{2}}$ | (ii) $\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$ | 16. (i) $59/70$ |
| (iii) $\frac{1}{2}$ | (iv) $-\frac{\sqrt{3}}{2}$ | (ii) $1/3$ |
| (v) $\sqrt{3}$ | | (iii) 10 |
| 6. (3) | | (iv) $-3/2$ |
| 7. (1) | | (v) -5 |
| 8. (2) | | (vi) $7/2$ |
| 9. (4) | | (vii) $x = 1$ |
| 10. (i) -3 | (ii) 0 | (viii) -9 |
| (iii) 3 | (iv) -26 | (ix) -11 |
| (v) 8 | (vi) 2 | (x) $x = 2$ |
| (vii) 3 | (viii) 0 | 17. (2) |
| (ix) 30 | (x) 3 | 18. (1) |
| 11. (A) \rightarrow (iv) | | 19. (4) |
| (B) \rightarrow (i) | | 20. (1) |
| (C) \rightarrow doesn't match any option | | 21. (4) |
| (D) \rightarrow (iii) | | 22. (1) |
| 12. (A) \rightarrow (2) $-\sqrt{3}/2$ | | 23. (1) |
| (B) \rightarrow (3) | | 24. (1) |
| (C) \rightarrow (4) | | 25. (1) |
| (D) \rightarrow (5) | | 26. (2) |
| (E) \rightarrow (1) | | 27. (2) |
| 13. $R = 4r$ | | 28. (1) |
| 14. $2/\pi$ | | 29. (2) |
| 15. (i) False | | 30. (4) |
| | | 31. (4) |
| | | 32. (2) |
| | | 33. (2) |

